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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/757,195

01/14/2004

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TI-27730A.1B

3583

23494 7590 04/03/2009
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EXAMINER

FOTAKIS, ARISTOCRATIS

ART UNIT

PAPER NUMBER

2611

NOTIFICATION DATE

DELIVERY MODE

04/03/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/757,195	Applicant(s) ASLANIS ET AL.	
	Examiner ARISTOCRATIS FOTAKIS	Art Unit 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01/15/2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 18 - 68 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 63 - 68 is/are allowed.
- 6) ☒ Claim(s) 18 - 23, 25 - 54 and 56 - 62 is/are rejected.
- 7) ☒ Claim(s) 24 and 55 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 15, 2009 has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 37 and 42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re claim 37, it is not clear what is periodically modulated.

Claim 42 recites the limitation "the selected level" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 18 – 22, 28 – 34, 36, 39 – 41, 43, 51 – 53, 58 - 62 are rejected under 35 U.S.C. 102(b) as being anticipated by the ADSL Standard-T1E1.4/93-007.

Re claim 18, the ADSL Standard discloses of a method for transmitting a frame synchronization pattern utilizing a plurality of frequency tones, said method comprising: obtaining a frame synchronization pattern (x_n , Page 51, 6.9.3 Synchronization Symbol); grouping the pattern into pairs of binary values (a pair (x,y) , Page 42, 6.6.1 Bit Extraction, Page 49, 6.8 Gain Scaling); assigning a first pair of binary values to at least one subcarrier (Nyquist frequency, 6.9.1.3); associating a second pair of binary values with a pilot tone and overwriting the second pair of binary values with values corresponding to a constant complex amplitude ($g_{64}=1$) for the pilot tone (*Carrier 64 is reserved for a pilot*, 6.9.1.2 and Page 106); mapping each of a plurality of remaining pairs of binary values to a complex amplitude (Z_i , 6.8 Gain scaling and 6.9.1.1. Data

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subcarriers); assigning each of the mapped pairs to a corresponding one of the frequency tones (IDFT, 6.9.2); suppressing the amplitude of at least one of the frequency tones (6.8 gain scaling); then modulating at least a subset of the frequency tones in accordance with the mapped pairs corresponding thereto to produce modulated frame synchronization data (6.9.2 Modulation and Inverse Discrete Fourier Transform); and transmitting the modulated frame synchronization data (ATU-C, Fig.4.1).

Re claim 33, the ADSL Standard discloses of transmitter for communicating data using multicarrier modulation, said transmitter comprising: a frame synchronization sequence source for producing a sequence of binary values, wherein a first pair of the binary values is associated with d.c. and Nyquist subcarrier frequencies (6.9.1.3, Page 50 and Page 51, line 7), and wherein each of a plurality of the remaining pairs of the binary values defines a complex amplitude for an associated frequency tone in a frequency domain synchronizing frame multicarrier symbol; circuitry for suppressing the complex amplitude of at least one of the frequency tones in the frequency domain synchronizing frame multicarrier symbol from that defined by its associated pair of binary values; a modulator, for producing a time domain multicarrier symbol from the frequency domain synchronizing frame multicarrier symbol (see claim 18); and a digital-to-analog converter for converting the time domain multicarrier symbol to an analog output signal (6.11, Page 51).

Re claim 51, the ADSL Standard discloses of a method for transmitting a frame synchronization pattern utilizing a plurality of frequency tones, said method comprising: obtaining a frame synchronization pattern; grouping the pattern into pairs of binary values; assigning a first pair of binary values to d.c. and Nyquist subcarriers; mapping each of a plurality of remaining pairs of binary values to a complex amplitude; assigning each of the mapped pairs to a corresponding one of the frequency tones; suppressing the amplitude of at least one of the frequency tones; then modulating at least a subset of the frequency tones in accordance with the mapped pairs corresponding thereto to produce modulated frame synchronization data; and transmitting the modulated frame synchronization data (see claims 18 and 33).

Re claim 19, the ADSL Standard discloses of wherein the at least one subcarrier includes the d.c. and Nyquist subcarriers (6.9.1.3).

Re claim 20, the ADSL Standard discloses of wherein the modulated frame synchronization data is a multicarrier symbol (DMT).

Re claims 21, 40 and 52, the ADSL Standard discloses of wherein the frame synchronization pattern is determined by the following equations:

$$x[p]=1 \text{ for } p= 1 \text{ to } 9,$$

$$x[p] = x[p - 4] \oplus x[p - 9] \text{ for } p = 10 \text{ to } 512,$$

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where $x[p]$ represents a binary value of the p th value of the sequence, and \oplus represents modulo- 2 addition (6.9.3, Page 51).

Re claims 22, 41 and 53 the ADSL Standard discloses of wherein the modulated frame synchronization data comprises a sequence of time-domain samples (IDFT, 6.9.2); and further comprising: prior to the transmitting step, adding a cyclic prefix corresponding to a selected number of samples from the end of the sequence of time-domain samples (6.10 Cyclic Prefix).

Re claims 28 and 43 the ADSL Standard further comprises: after the modulating and suppressing steps, converting the modulated frame synchronization data from digital data to analog signals at a selected sampling frequency (2208KHz, Page 51); wherein the sampling frequency is an integral power of two times (2^3) the frequency of the pilot tone(276KHz, 6.9.1.2 Pilot) ($2^3 \times 276 = 2208$).

Re claims 29 and 58, the ADSL Standard discloses of wherein the transmitting step periodically transmits the modulated frame synchronization data among modulated data frames (beginning of Page 51 and Page 31).

Re claims 30 and 59, the ADSL Standard discloses of wherein the transmitting step transmits the modulated frame synchronization data over two-wire telephone subscriber line (1.1 Scope, Page 6).

Re claims 31 and 60, the ADSL Standard discloses of wherein the transmitting step transmits the modulated frame synchronization data in an asynchronous digital subscriber line system in an upstream direction of transmission (Page 10).

Re claims 32 and 61, the ADSL Standard discloses of wherein the transmitting step transmits the modulated frame synchronization data in an asynchronous digital subscriber line system in a downstream direction of transmission (Page 10).

Re claim 34, the ADSL Standard discloses of wherein the suppressing circuitry comprises: a bit allocation table (bit and gain table, Page 42), for providing an energy scaling vector by which the complex amplitude for at least one of the frequency tones in the frequency domain synchronizing frame multicarrier symbol is multiplied prior to being applied to the modulator (6.8 gain scaling).

Re claim 36, the ADSL Standard discloses further comprises: a coder for encoding a data stream into frequency domain multicarrier data symbols arranged in frames (6.5 Encoder, Page 42); wherein the modulator also produces time domain multicarrier data symbols from the frequency domain multicarrier data symbols (IDFT, 6.9.2); and wherein the digital-to-analog converter also converts the time domain multicarrier data symbols to an analog signal (6.11).

Re claim 39, the ADSL Standard discloses of wherein the modulator comprises an inverse FFT unit (6.9.2).

Re claims 50 and 62, the ADSL Standard discloses of wherein a second pair of the binary values is associated with a pilot frequency tone and is overwritten with a constant complex amplitude for the pilot frequency tone (see claim 18).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

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were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 23, 25 – 27, 35, 44 – 49, 54 and 56 – 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over the ADSL Standard-T1E1.4/93-007 in view of Hunt et al (US 5,400,322).

Re claims 23, 35 and 54 the ADSL Standard discloses of all the limitations of claim 18 as well as allocating a bit loading for the plurality of frequency tones (Page 42, bit allocation table). However, the ADSL Standard does not explicitly disclose of wherein the suppressing step suppresses the amplitude of at least one of the plurality of frequency tones having a bit loading below a selected level.

Hunt teaches of allocating a bit loading for the plurality of frequency tones (#40, Fig.2) and wherein the suppressing step suppresses the amplitude of at least one of the plurality of frequency tones (unused frequency tones) having a bit loading below a selected level (zero bits) (Col 6, Lines 5 – 20 and Col 8, Lines 53 - 57).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have suppressed the amplitude of the tones that had a bit loading of zero bits for the benefit of reducing power consumption.

Re claims 25 and 56, the ADSL Standard discloses of wherein the allocating of a bit loading for each frequency tone is based on a signal-to-noise ratio for the frequency tone (first paragraph of Page 42).

Re claims 26 and 57, the ADSL Standard further comprises: producing an energy scaling vector for the plurality of frequency tones from the bit loading (g_i , 6.8 gain scaling); wherein the suppressing step comprises: for at least one of the plurality of frequency tones, multiplying the complex amplitude of the mapped pair of binary values by the energy scaling vector for that tone (6.8 gain scaling).

Re claim 27, the ADSL Standard further comprises: a step of initializing communications with a receiver, prior to the allocating step, the initializing step comprising: obtaining the frame synchronization pattern; grouping the pattern into pairs of binary values; mapping each pair of the binary values to a complex amplitude; assigning each of the mapped pairs to a corresponding one of the frequency tones of the multicarrier modulation transmission system; modulating at least a subset of the frequency tones in accordance with the mapped pairs corresponding thereto to produce modulated frame synchronization data; and transmitting the modulated frame synchronization data to a receiver, so that the receiver can achieve frame synchronization with the transmitter (12.4 Transceiver Training, Pages 105 – 106, Fig.6.2.1 and Pages 49 - 50).

Re claim 44, the ADSL Standard discloses all the limitations of claim 33 as well as a transceiver comprising the transmitter but does not specifically disclose of the transceiver further comprising: an analog-to-digital converter for converting a received analog signal to a serial time domain sample stream; a demodulator for demodulating the time domain sample stream to a frequency domain multicarrier symbol; and circuitry for recovering a decoded signal from the frequency domain multicarrier symbol.

Hunt discloses of a transceiver comprising: an analog-to-digital converter for converting a received analog signal to a serial time domain sample stream (#42, A-D, Fig.2); a demodulator for demodulating the time domain sample stream to a frequency domain multicarrier symbol (FFT, #42, Fig.2); and circuitry for recovering a decoded signal from the frequency domain multicarrier symbol (#46, Fig.2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the receiver in the transceiver system of the ADSL standard perform the reverse operation of a transmitter to recover the transmitted data.

Re claim 45, the ADSL Standard discloses further comprises: a hybrid circuit, for coupling an input of the analog-to-digital converter and an output of the digital-to-analog converter to a transmission path (Fig.4.1).

Re claim 46, the ADSL Standard discloses of wherein the transmission path comprises two-wire telephone subscriber line (1.1 Scope, Page 6)..

Re claims 47 - 49, the ADSL Standard discloses of wherein the digital-to-analog converter operates at a first sampling frequency (2208 KHz, 6.11.1) so that the output analog signal corresponds to a first rate of transmission (table 6.1.1, ATU-C, Page 28); and wherein the received analog signal corresponds to a second rate of transmission (table 7.1.1, ATU-R, Page 53).

Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over the ADSL Standard-T1E1.4/93-007.

The ADSL Standard discloses all the limitations of claim 33 but does not specifically disclose or show wherein the frame synchronization sequence source comprises circuitry for storing the frame synchronization pattern. However, a frame synchronization sequence source that generates the frame synchronization pattern would require a storage circuitry to store the frame synchronization pattern to periodically transmit the frame synchronization pattern every 68 data frames avoid recalculation of the frame synchronization pattern.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the frame synchronization sequence source comprise circuitry for storing the frame synchronization pattern for the benefit of reduced power consumption.

Allowable Subject Matter

Claims 24 and 55 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ARISTOCRATIS FOTAKIS whose telephone number is (571)270-1206. The examiner can normally be reached on Monday - Thursday 6:30 - 4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh M. Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Aristocratis Fotakis/

Examiner, Art Unit 2611

/Chieh M Fan/

Supervisory Patent Examiner, Art Unit 2611